

Yuba County Water Agency Conjunctive Use Project

1. Project Description

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| <i>Project Type:</i> | Conjunctive cater management |
| <i>Location:</i> | Yuba County |
| <i>Proponent(s):</i> | Yuba County Water Agency (YCWA or Agency) |
| <i>Project Beneficiaries:</i> | YCWA, downstream users, the environment, the Sacramento-San Joaquin Delta |
| <u>Total Project Components:</u> | Short-term components, integrating of groundwater, extending water distribution facilities. |
| <i>Potential Supply:</i> | 50,000 to 100,000 acre-feet (ac-ft) in dry years |
| <i>Cost:</i> | \$25 million |
| <i>Current Funding:</i> | \$1.5 million |
| <u>Short-term Components:</u> | Hydrologic and feasibility reports; begin initial California Environmental Quality Act (CEQA) and preliminary design; Initial Phase - Pilot Project |
| <i>Potential Supply (by 2003):</i> | 15,000 ac-ft/yr |
| <i>Cost:</i> | \$1.3 million |
| <i>Current Funding:</i> | \$1.3 million |
| <i>Implementation Challenges:</i> | Public perception, environmental regulatory compliance, land acquisition |
| <i>Key Agencies:</i> | Yuba County, member districts, California Department of Water Resources (DWR), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), environmental interest groups |

Summary

The Yuba County Conjunctive Use Program would be an integral part of comprehensive watershed and groundwater management in Yuba County. The primary goal of the conjunctive use program is to improve water supply reliability for in-basin needs. The results of improved water supply reliability through conjunctive use would be greater flexibility in the operation of water management facilities of the YCWA, providing benefits to both in-basin and out-of-basin water users. As part of the program, a pilot project (short-

term project) has been formulated as the vehicle for initiating development of a long-term program.

The objectives of the Agency's long-term conjunctive use program are to assure a more reliable water supply for Yuba County, and as a result, allow for more flexible operation of the Agency's Yuba River Development Project (YRDP) for both in-county and out-of-county water needs. In the recent past, the benefits of conjunctive use have been realized for out-of-county benefits through groundwater substitution water transfers. The greatest benefit was realized in 1991 for the State Drought Water Bank where over 83,000 ac-ft was transferred from the Yuba River.

Because of the recent State Water Resources Control Board Decision D-1644, which dedicates significantly greater quantities of water for in-stream flows than previously required, in-basin shortages will occur in the driest of years without supplemental supplies from conjunctive use of the in-basin groundwater resources. By firming up the surface water supplies within Yuba County, this supplemental water supply would help to maintain some flexibility of operation for the YRDP, which has historically been a vital source of dry-year water for water-short areas throughout the state.

Short-term Component

In order to facilitate the development and refinement of the major components of a countywide conjunctive use program, a pilot project has been initiated. The concept is to use a pilot implementation of conjunctive use operations as a means to further refine the knowledge base on the basin's hydrogeology and, more importantly, to provide a mechanism for exploring and defining the non-physical elements of a fully coordinated basinwide conjunctive use program. The elements to be tested and refined include the following:

- **Institutional**—Definition of the interrelationship between the Agency, various local member irrigation districts, local farmers, and any third parties that may be affected by conjunctive use operations
- **Engineering/Hydrogeologic**—Refinement of operational limits for groundwater-level management, water supply risk assessment, analysis of coordinating surface water operations with groundwater pumping and well construction parameters
- **Managerial**—Coordination of program oversight and communications
- **Legal**—Voluntary acquisition of rights-of-way, easements, and contracts
- **Environmental**—Coordination of surface water operations for fishery benefit, assessment of well site impacts, and assessment of secondary environmental effects
- **Social/Economic**—Determination of social and economic benefits of the conjunctive use program and identification of any impacts that must be addressed

The pilot project is fully funded through a \$1.5 million Proposition 13 (State Water Bond 2000) grant.

Long-term Component

The primary purpose of this memorandum is to evaluate the potential for this project to provide water supply benefits in the short-term (by end of 2003). As part of this initial evaluation, potential long-term components of the proposed project (defined as any part of the project proceeding past or initiated after December 2003) have been considered on a conceptual level. Further consideration and technical evaluation of long-term component feasibility and cost would occur as the next level of review under the Sacramento Valley Water Management Agreement. As such, long-term component project descriptions are included in these short-term project evaluations only as a guide to the reader to convey overall project intent.

Yuba County Conjunctive Use

Conjunctive use in Yuba County has already been demonstrated to be feasible from a hydrogeologic-water resource standpoint as a result of the previous groundwater substitution transfers undertaken in 1991 and 1994, and the Agency's detailed examination of groundwater issues over the past decade.

The goal of the Yuba County Conjunctive Use Program is to manage the groundwater and surface water resources within the County, and available to the Agency, to fully meet the in-basin water needs. To accomplish this goal, the objective of the Agency is to exercise the Yuba groundwater sub-basin within historical levels. This groundwater resource management would be done in concert with the surface water facilities of the YRDP to significantly increase the water supply benefits within the County, and subsequently for statewide benefit.

The Yuba County Conjunctive Use Program is anticipated to have four major elements. These elements would include but are not limited to the integration of groundwater into the actively managed resources of the YCWA and member districts for long-term water supply and the expansion of water distribution facilities to the areas of the Wheatland Water District. This would allow for the conjunctive operation of the major portions of the Yuba-South Sub-basin.

Yuba River Watershed Overview

The Yuba River basin drains approximately 1,339 square miles of the western Sierra Nevada slope, including portions of Sierra, Placer, Yuba, and Nevada counties. The Yuba River is a tributary of the Feather River, which, in turn, is a tributary of the Sacramento River. The average annual unimpaired flow of the Yuba River at Smartville is 2.45million ac-ft; however, a portion of this water is diverted out of the watershed and is not available to the lower Yuba River. The annual unimpaired flow has ranged from a high of 4,925,000ac-ft in 1986 to a low of 370,000 ac-ft in 1977.

Since the early 1900s, the Yuba River basin has been significantly developed for mining and debris control, water supply, power generation, and flood control. This development includes the upstream hydroelectric diversions by Pacific Gas and Electric Company (PG&E), hydroelectric and irrigation diversions by Nevada Irrigation District (NID) and Oroville-Wyandotte Irrigation District (OWID), the construction of Daguerre Point Dam and Englebright Dam by the U.S. Army Corps of Engineers (COE) for debris control, and the

construction of New Bullards Bar Dam by the Agency for water supply, flood control, hydroelectric generation, recreation, and fish and wildlife enhancement.

Daguerre Point Dam, the first dam constructed on the lower Yuba River, is located about 12.5 miles downstream of the current Englebright Dam. Construction was completed in 1906, with diversion of the river over the dam being completed in 1910 (CDFG, 1991). Daguerre Point Dam has two fish ladders over the dam (north and south ladders) that allow anadromous salmonids to pass the structure; however, these ladders are ineffective at facilitating fish passage at certain river flows. Today, Daguerre Point Dam is the location of the majority of water diversions from the lower Yuba River.

Englebright Dam, the second dam constructed on the lower river, was built by COE in 1941 to collect placer-mining debris that was moving down the Yuba River into the Sacramento Valley. All three branches of the Yuba River flow into Englebright Reservoir. Consequently, construction of Englebright Dam completely blocked anadromous fish migration into the north, middle, and south forks of the Yuba River. The dam constitutes the upstream extent of anadromous fish migration today. The approximately 24-mile-long reach of the Yuba River between Englebright Dam and its confluence with the Feather River has been defined as the lower Yuba River.

The Agency began operation of its Yuba River Development Project in 1970. As part of the YRDP, New Bullards Bar Dam was built on the North Yuba River. The Agency operates the Colgate and Narrows II powerhouses below New Bullards Bar and Englebright dams, respectively. The release capacity of the Narrows II Powerhouse is approximately 3,400 cubic feet per second (cfs), which defines the Agency's greatest controlled release capability from Englebright Reservoir into the lower Yuba River.

New Bullards Bar Reservoir, located upstream of Englebright Dam, is the primary storage reservoir within the Yuba River basin, with a storage capacity of about 966,000 ac-ft. Fifteen other reservoirs have been constructed in the upper portion of the basin, with a combined storage capacity of approximately 400,000 ac-ft. Except for New Bullards Bar Reservoir, there is only minimal storage for regulation of snowmelt within the basin. The smaller storage facilities on the headwaters of the South Yuba and Middle Yuba River usually fill with early runoff. Hence, much of the spring and early summer flow to the lower Yuba River is a result of uncontrolled snowmelt within the basin. In the summer and early fall, prior to the precipitation season, most of the flow in the lower Yuba River is regulated by releases from New Bullards Bar Reservoir.

The coupled operation of New Bullards Bar Reservoir and Englebright Reservoir includes releases through the New Colgate, Narrows I (owned by PG&E), and Narrows II hydroelectric generating facilities, providing the principal regulation of the lower Yuba River. Under existing water rights and agreements, PG&E may operate up to 45,000 of the 67,000 ac-ft of Englebright Reservoir storage, but only about 10,000 ac-ft of this capacity is typically exercised. This fluctuation of the Englebright Reservoir storage is principally for daily or weekly regulation of winter freshets and because Englebright Reservoir is an afterbay for Colgate Power House operations. The impaired inflow into Englebright Reservoir is about 1.6 million ac-ft per year. On average, 1.1 million ac-ft per year passes through New Bullards Bar Reservoir; the remaining 0.5 million ac-ft is local inflow and flow from the South Yuba and Middle Yuba rivers directly into Englebright Reservoir. Below

Englebright Reservoir, local inflow and runoff from Deer Creek contributes, on average, an additional 170,000 ac-ft per year below the Smartville gage.

The New Bullards Bar Dam and Reservoir, Colgate Power House, NarrowsII Powerhouse, and Lower Yuba River diversions and other conveyance facilities make up the principal components of the YRDP, which the Agency constructed in the 1960s.

Yuba County Water Agency

Institutional

The Agency is an independent, stand-alone organization created by the Yuba County Water Agency Act as provided for by the California legislature. The Agency and its YRDP are subject to numerous contracts, agreements, licenses, permits, and regulatory oversight from a wide range of organizations including a major utility, state, and federal resource and regulatory agencies, and local water providers. The Agency was formed in 1959 to “develop and promote the beneficial use and regulation of the water resources of Yuba County...” Two sections of the Yuba County Water Agency Act are of particular importance to the implementation of groundwater management in Yuba County. The first relates to water supply:

§84-4. Availability of water supply; necessary acts

Sec. 4. The agency shall have the power as limited in this act to do any and every lawful act necessary in order that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the agency, including, but not limited to irrigation, domestic, fire protection, municipal, commercial, industrial, recreational, and all other beneficial uses and purposes. (Stats.1959, c. 788, p. 2783, § 4.)

The second section relates to the storage of water:

§84-4. Storage of water; conservation and reclamation; actions involving use of waters or water rights

Sec. 4.3. The agency shall have the power to store water in surface or underground reservoirs within or outside the agency for the common benefit of the agency; to conserve and reclaim water for present and future use within the agency; to appropriate and acquire water and water rights, and to import water into the agency and to conserve and utilize, within or outside the agency, water for any purpose useful to the agency;...

Since its formation in 1959, the Agency has worked with its member districts, stakeholders, and local, state, and federal agencies to develop water resources within Yuba County for all beneficial uses. The YRDP is the major water resource management facility owned and operated by the Agency. This facility is used to partially regulate the flows of the lower Yuba River for flood control, water supply, fishery enhancement, recreation, and power generation.

Water Rights

As part of conjunctive use operations within Yuba County, the Agency would utilize its water rights to regulate waters of the Yuba River in coordination with groundwater pumping activities. This coordinated operation is intended to increase the overall yield of Yuba County's water resources for beneficial use. For the diversion and use of waters within the Yuba River watershed, the Agency holds various water right permits and licenses for power, irrigation, domestic, and industrial uses in conjunction with its YRDP. The Agency's consumptive use water right permits total more than 1million ac-ft per year. The place of use of these rights is the Agency's service area, which covers the areas of its member districts and includes most of the agricultural land in Yuba County.

The water rights to be utilized for the operation of the conjunctive use program include those covered by permit numbers 15026, 15027, and 15030. These permits provide more than sufficient water (legally) for use in the program. Permit 15026 alone has an upper limit of over 1.1 million ac-ft.

If surface water is to be used outside the Agency's service area or member district places of use, a water transfer approved by the State Water Resources Control Board would be required. As detailed in Table 14A/B-1, which provides a list of the Agency's recent water transfers, the Agency has significant experience in water transfers. This experience can be drawn upon if the conjunctive use program yields sufficient water to meet Yuba County demands and provides a surplus, creating an opportunity to transfer water to other needy areas in California.

TABLE 14A/B-1
Recent Agency Water Transfers

| Year | Transferred to | Amount (ac-ft) |
|-------------|---|---------------------------|
| 1987 | Department of Water Resources | 83,100 |
| 1988 | Department of Water Resources | 135,100 |
| 1989 | Department of Water Resources | 90,000 |
| 1989 | Department of Water Resources | 110,000 |
| 1989 | City of Napa | 7,000 |
| 1989 | East Bay Municipal Utility District (portion retransferred to Department of Fish and Game | 60,000 |
| 1990 | City of Napa | 7,000 |
| 1990 | Department of Water Resources | 109,000 |
| 1990 | Tudor/Feather | 2,951 |
| 1991 | State Water Bank | 99,200 |
| 1991 | State Water Bank, Department of Fish and Game | 28,000 |
| 1991 | City of Napa | 7,500 |
| 1992 | State Water Bank | 30,000 |
| 1997 | Bureau of Reclamation (refuge water) | 20,000 |
| 1997 | Sacramento Area Flood Control Agency | 50,000 |

Yuba County Groundwater Sub-basin

The Yuba County groundwater sub-basin lies entirely within the Sacramento Valley groundwater basin, within the overlying political boundary of Yuba County. The County boundary also partially defines the Yuba County groundwater subbasin. It extends from the Sierra Nevada foothills on the east and to the Feather River on the west. The southern boundary is the Bear River, and the northern boundary is Honcut Creek. The Yuba County groundwater basin encompasses an area of approximately 270 square miles. Information provided herein has been excerpted from the extensive investigation and report titled *Groundwater Resources and Management in Yuba County* (Bookman-Edmonston, 1992), and other studies conducted over the past decade.

Geologic Setting

The sub-basin area is bounded on the east by the impermeable rocks of the Sierra Nevada. These same rocks and younger consolidated rocks extend beneath the sub-basin at a gradually increasing depth toward the Feather River and beyond to the trough of the Sacramento Valley. Fresh groundwater is stored in this wedge-shaped body of alluvial material to depths of 1,000 feet. Beneath these alluvial deposits are consolidated rocks, which may contain saline water and are effectively non-water-bearing.

Physical Structure of Freshwater-bearing Formation

The structure is thickest along the Feather River and thinnest along the Sierra Nevada boundary. The thickness varies from 1,000 feet in the southwest corner near the Bear River to less than 300 feet at the base of the Sierra foothills. All of the stratified alluvial deposits slope gently to the west. No faults or folding of strata are known to occur within the freshwater-bearing area.

Groundwater Occurrence and Development

Groundwater occurs generally under water table or unconfined conditions throughout most of the groundwater sub-basin. Well drillers report no changes in water levels during the drilling in many wells, both moderately deep and shallow, indicating a lack of confinement. In some areas, the water levels in cable-tool-drilled holes are reported to rise after water was first encountered. This condition is more common in the deeper wells, particularly in the Laguna Formation, where groundwater is considered to be confined by overlying clay layers. Confinement probably occurs at depths in excess of 300 to 400 feet.

Well Yields

Well yields and water level drawdowns are known through the testing of industrial, irrigation, and community supply wells soon after they were drilled by either well drillers or pump installers. These yields may be recorded along with the well logs on the "Well Drillers Report" filed with the California Department of Water Resources (DWR). Ninety-two driller reports filed with DWR and reviewed for the report *Groundwater Resources and Management in Yuba County* (Bookman-Edmonston, 1992) have production data. The average well yield per township area (36 square miles) range from 1,000 to 2,300 gallons per minute (gpm), and the average specific capacity can range from 16 to 74 gpm per foot.

The area of highest well yields is in the Stream Channel and Floodplain Deposit Formation of the Yuba River. Wells with depths of 200 to 400 feet can yield 2,000 to 4,000 gpm, with most of the yield derived from the upper 100 feet or more of sand and gravel. The area with the lowest yield can be found on the Beale Air Force Base property. Wells near the property range in depth from 264 to 354 feet and supply an average of 1,000 gpm per well.

Irrigation wells commonly produce between 1,000 to 2,000 gpm and range in depth from a few hundred feet to 700 feet. Typically, the well yield is primarily derived from the Older Alluvium Formation because the underlying Laguna Formation is much less permeable.

Specific Capacity

Specific capacity is a measure of a well's productive capability, accounting for both aquifer and well construction characteristics. Specific capacity is determined by pumping a known rate from a well and measuring the resulting drawdown in water levels. Specific capacity is computed by dividing the pumping rate (in gpm) by the drawdown (in feet). Because variations in specific capacity can reflect both aquifer and well construction characteristics, some care must be used in their interpretation. Depending on the source of specific capacity data, average specific capacity varies from 40 to 67 gpm.

Storage Coefficient

In general terms, the storage coefficient quantifies the volume of water that is stored or released from storage when groundwater levels rise or fall. The ability of water-bearing material to store water is quantified by the storage coefficient. The storage coefficient is defined as the volume of water that an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in water levels. The storage coefficient has no units and is frequently expressed as a percentage. Under confined conditions, the storage coefficient reflects only the expansion of water and compression of the aquifer that occur with changes in water levels. Both of these effects are relatively small, and the confined storage coefficient is very low, ranging from 0.5 to 0.005 percent.

Specific Yield

The average specific yield in the groundwater basin is 6.8 percent. Specific yields will vary greatly as a result of the predominant geologic formation present at a particular location. For example, the Laguna Formation, which is present on the east side of the basin, has specific yields that range from 4 to 5 percent. The highest specific yields are 10 to 12 percent in the upper zones located in the middle of the sub-basin, along the Yuba River. Yields in all parts of the basin decrease with depth where the Laguna Formation and other older, more cemented formations are present.

Transmissivity

Transmissivity has been estimated to be approximately 260,000 gallons per day per foot of aquifer width for the majority of the groundwater basin. Estimated transmissivities for the western border of the groundwater basin are higher. Along the Feather River, transmissivities were about 390,000 gallons per day per foot. High transmissivities along the Feather River reflect the thick deposits (over 100 feet) of highly permeable stream channel sediments at this location.

Groundwater Storage

Specific yield can be used to estimate the amount of groundwater storage. Average specific yield amounts by depth zone were taken from the studies by the U.S. Geological Survey that were presented in Bulletin No. 6 of the State Water Resources Control Board as described in the previous discussion of storage coefficient. Estimates of storage capacity for equivalent depth zones are presented separately in Table 14A/B-2 for the Yuba North and Yuba South basins. These storage capacity estimates were computed directly from the area of each subarea, average specific yield in each depth zone, and the thickness of each depth zone.

TABLE 14A/B-2
Estimated Storage Capacities and Specific Yields

| | Depth Zones (feet) | | | |
|---|-----------------------|-----------|------------|-----------|
| | 20 to 50 | 50 to 100 | 100 to 200 | 20 to 200 |
| Yuba-North Basin | | | | |
| Specific Yield (percent) | 8.9 | 8.3 | 5.5 | 6.9 |
| Storage Capacity (ac-ft) | 130,000 | 210,000 | 280,000 | 620,000 |
| Yuba-South Basin | | | | |
| Specific Yield (percent) | 8.0 | 7.4 | 6.2 | 6.8 |
| Storage Capacity (ac-ft) | 210,000 | 210,000 | 280,000 | 620,000 |
| Study Area Total Storage by Depth Zone (ac-ft) | 340,000 | 540,000 | 830,000 | 1,710,000 |

For the groundwater basin north of the Yuba River, the groundwater storage capacity estimated to a depth of 200 feet is 615,000 ac-ft. Storage capacity in the groundwater basin south of the Yuba River is estimated to be 1,095,000 ac-ft. The total storage capacity in the study area was estimated as 1,710,000 ac-ft. This amount represents the entire quantity of ground water contained to a depth of 200 feet. As can be seen from Table 14A/B-2, if the conjunctive use program uses only that portion of the sub-basin between 20 and 50 feet in depth, the operable storage would be about 340,000 ac-ft. If the 20- to 100-foot-deep range were used, the operable storage would increase to about 540,000 ac-ft. Caution should be taken when using these numbers because they do not represent the operational characteristics such as recharge rate, recharge origin, and pumping issues. However, they do indicate that a significant body of water is available from which to draw under various operational scenarios.

Groundwater Storage Conditions

The Yuba River hydraulically divides the Yuba groundwater basin into the Yuba North Basin and the Yuba South Basin, which provide 40 percent and 60 percent, respectively, of the total groundwater storage capacity of the Yuba groundwater basin. Historically, irrigation demands in the Yuba-North Basin area have been sufficiently supplied with diversions from the Yuba River. Because this surface water supply was adequate, significant groundwater pumping capacity has not developed in this area. Conversely, in the Yuba South Basin, surface water supplies were limited until the South Yuba Canal was developed in 1983. Historically, agricultural and urban water uses in the Yuba-South Basin area relied heavily on groundwater supply, resulting in a large pumping depression near the Wheatland area. Since the construction of the South Yuba Canal, and delivery of surface water by the Agency to the member districts of Brophy Water District, South Yuba Water

District, and, more recently, Dry Creek Mutual Water Company, groundwater storage has recovered to the extent that current groundwater storage in the Yuba-South Basin area probably exceeds that of 1960 and nearing the levels of the pre-development era.

By 1997, the depth and extent of the depression in the Yuba-South Basin area near Wheatland had been significantly reduced. The 1997 groundwater contours suggest that the groundwater basin in the Yuba-South Basin area is primarily recharged by accretion from the Yuba River above the Marysville gage and by deep percolation of irrigation water and precipitation. The leveled groundwater contours near the Feather River suggest low accretion to the groundwater basin, if any, from the Feather River.

Figure 14A/B-1 shows the amount of groundwater storage in the Yuba-South Basin area for water years 1960 to 1998, assuming 200,000 ac-ft of storage in 1960 as a reference point. The changes in groundwater storage are shown on Figure 14A/B-2. After 1983, most of the yearly storage changes are positive, implying a net gain in the groundwater basin. There are several significant changes in the historical trace of groundwater storage:

- The cause of the abrupt decrease in 1965 is unclear.
- The abrupt decrease in the 1976 to 1977 period was a result of the extensive drought in California.
- The beginning of a significant rebound of groundwater storage in 1983 was a result of the new water supply from the Agency through the South Yuba Canal.
- The storage decrease in 1991 was a result of a conjunctive use operation for DWR's Drought Water Bank, through which 80,000 ac-ft of groundwater was extracted and used for local supply, thus allowing an equivalent amount of surface water to be transferred.

Figures 14A/B-1 and 14A/B-2 show the estimated changes in the annual groundwater storage rate for the Yuba-South Basin area range from 15,100 ac-ft to 21,200 ac-ft, depending on year type, since the construction of the South Yuba Canal.

2. Potential Project Benefits/Beneficiaries

Member Districts

The primary project beneficiaries are the member districts in Yuba County. Given the uncertainties of future water supplies because of the recent State Water Resources Control Board Decision D-1644, the once firm water supply from the YRDP has been compromised. Operational studies of the YCWA surface water supplies show that in 2006 when the in-stream flow requirements of D-1644 increase significantly, in-basin water supply shortages will occur frequently. Although the long-term yield of the Yuba sub-basins has not been fully analyzed, a conjunctive use program would have a significant beneficial impact on the reliability of water supply deliveries to the YCWA member districts.

Out-of-county Water Users

Should the conjunctive use program provide a water supply sufficient to significantly reduce in-basin shortages in dry years, surplus water could be available for out-of-county transfer. Past transfers out of county have been for urban and agricultural uses.

Environmental

Reduction of diversion demands on the Yuba River would provide in-stream flow benefits for fishery enhancement in dry years. Reduction of diversion demands through conjunctive use would allow for a more flexible operation of the YRDP. This increased flexibility could provide a more adaptive management approach to scheduling of flows to meet multiple objectives including fishery enhancement.

3. Project Costs

The cost opinions shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation from the information available at the time of the estimate. It is normally expected that cost opinions of this type, an order-of-magnitude cost opinion, would be accurate within +50 to -30 percent. Project costs were developed at a conceptual level only, using data such as cost curves and comparisons with bid tabs and vendor quotes for similar projects. The costs were not based on detailed engineering design, site investigations, and other supporting information that would be required during subsequent evaluation efforts.

The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the final project costs will vary from the opinions presented here. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

The total project is estimated at \$25 million dollars. Of this total, the well facilities account for approximately \$8 million; the recharge facilities are \$3 million; the extension of distribution facilities to Wheatland are \$6 million; contingencies and allowances are \$4 million; and engineering, environmental, construction management, and administration costs are \$4 million dollars.

Project costs would be borne by the primary project beneficiaries, funded through grants obtained through state and federal programs, and through funds received from water transfers.

Typical annual operations and maintenance (O&M) costs for a project of this nature would range from 12 to 15 percent of initial capital costs. Annual O&M costs would include power for pumping wells and distribution; recharge, recovery, and water delivery scheduling and implementation; inspection and maintenance of facilities, maintenance of recharge basins and wells; and data collection and reporting of groundwater levels, water quality, and recharge and recovery rates. Annual O&M costs would approach \$3 million dollars per year in dry years and about \$2.4 million as a long-term average.

4. Environmental Issues

As noted in Section 2, this project is anticipated to provide benefits in the form of increased water supply, more flexible water management, and improved water quality – all of which could improve the greater Sacramento River ecosystem.

Project implementation would also result in impacts to the environment, notably through the artificial manipulation of groundwater levels. In some areas of the state, these types of projects have resulted in public concern and controversy, which tends to heighten scrutiny of the environmental effects of such projects. Efforts to address these concerns are noted in Section 5, Implementation Challenges. Construction-related impacts would also occur prior to project implementation. Construction-related impacts would be similar to other, common construction projects that occur near seasonal drainages and waterways. It is likely that the appropriate level of environmental documentation necessary for this project would be an environmental impact statement/environmental impact report (EIS/EIR).

Implementation of the project would also require issuance of permits from various regulatory agencies. Following is a summary of the likely permitting requirements. Additional permitting requirements may be identified pending further project refinement.

- **State Water Resources Control Board**—Applications for new water rights and changes in point of diversion would be required.
- **Regional Water Quality Control Board**—Large amounts of earthwork would be required for the recharge basins. Depending upon project configuration and location, Water Quality Certification under the federal Clean Water Act may be required for construction.
- **Federal and State Endangered Species Act**—Consultation with state and federal resource agencies (e.g., USFWS, NMFS, CDFG) may be required to protect special-status species and their habitat.
- **U.S. Army Corps of Engineers (COE)**—The project may affect wetland habitat and require a permit for discharge of dredged or fill material pursuant to Section 404 of the federal Clean Water Act.
- **State Lands Commission**—Project would need to consult with State Lands Commission on the public agency lease/encroachment permitting for use of state lands.
- **State Reclamation Board**—The project may be subject to rules regarding encroachment into existing floodways.
- **Federal Emergency Management Agency (FEMA)**—Letters of map revision need to be filed with FEMA for projects that affect Flood Insurance Rate Maps.
- **Advisory Council on Historic Preservation**—Consultation under Section 106 of the National Historic Preservation Act may be necessary if historical resources are affected by construction of the project.

- **California Department of Fish and Game**—If alterations to streams or lakes are required as part of project implementation, a Streambed or Lakebed Alteration Agreement may be required.
- **Local governments and special districts**—Specific agreements for rights-of-way, encroachments, use permits, or other arrangements may need to be made with local entities in the vicinity of the project.

A draft CEQA environmental checklist has been prepared for this proposed project and is included as an attachment to this evaluation. The checklist provides a preliminary assessment of the environmental areas of concern, as well as areas that are not likely to be of concern, associated with this project. The checklist would be finalized as part of the environmental compliance required for project implementation.

5. Implementation Challenges

The project implementation would occur in several incremental stages, each of which would have significant challenges. Many of these challenges would be inherent to any project of this size and complexity. The following lists some of the implementation challenges anticipated to be associated with this project.

Public Perception

Landowners have significant concern regarding possible groundwater overdraft. Monitoring and modeling of groundwater levels would not only be an essential part of this project technically, but also politically. Further, public concern accompanies any water delivery project during these water-tight times with regard to whom any project may or, just as importantly, may not benefit. As a result, many counties have passed ordinances and set numerous groundwater management objectives. To that end, the county has set strict guidelines for such water management programs as water transfers that dictate the priority of transfers taking into consideration primarily the intended recipient of the water.

Coordination among Public and Private Entities

Strong coordination would be required among local, state, and federal entities such as USFWS, USBR, and DWR. The governmental agencies would have strong interests associated directly with the project and indirectly as it may affect other interests in the area. It is highly probable that because of the complexity and far-reaching implications of the project that competing interest may arise. Reliable communication and integrated coordination would be required to create a successful project.

Coordination between Concurrent Projects

Numerous parties are examining similar projects throughout the valley. To optimize the effectiveness of these projects, coordination between the projects would be required from the onset. The strongest motivation for such an effort is three-fold: (1) to avoid duplication of effort and as a result efficiently utilize available funds, (2) to avoid the nullification of project benefits through competing projects, and perhaps most importantly, (3) to optimize the benefits of these projects to the watershed.

Lack of Sufficient Groundwater Data

In many areas, there is limited groundwater information available, or the information that is available is unreliable.

Environmental Regulatory Compliance

Extensive environmental documentation, surveying, monitoring, and permitting would be required for this project. Habitat for known Endangered Species Act (ESA)-listed species such as the valley elderberry longhorn beetle and the giant garter snake is present within the project area. Project scheduling would have to reflect environmental regulatory requirements including any limitation on windows of construction.

Land Acquisition

It is probable that land would have to be acquired for the production wells and conveyance systems. Some landowners may be resistant to the land purchases.

6. Implementation Plan

Extensive engineering and environmental investigations are necessary to further evaluate this project. Six major tasks are recommended in two phases. Phase 1 (Pilot Project) corresponds to the identified short-term component of the overall project (Tasks 1.1 and 1.2 and portions of Tasks 2.1 and 2.2 could also be initiated in the short-term). A phased implementation would be used. The project phases include: Phase 1 (1.1) Hydrologic modeling and hydrogeologic reports, (1.2) Project management/program definition report; Phase 2 (2.1) Environmental impact report/study, (2.2) Preliminary design, (2.3) Design drawings and specifications, and (2.4) Construction. Phase 1.2 and 2.1 are planned to span both Phase 1 and Phase 2. The total duration of all engineering, environmental, institutional and construction-related tasks is approximately 4 years.

1.1 Hydrologic modeling/hydrogeologic report—A modeling effort is required to evaluate the hydrologic alternatives and opportunities for the project. The study would have the following four primary goals: (1) identify the quantity, quality, and timing of additional water sources derived from conjunctive use operations; (2) determine the hydrogeologic parameters of the aquifer in the Yuba Sub-basin area, and determine a sustainable yield for the sub-basin; (3) refine fundamental design criteria, such as the size, location, and number of wells, and determine the optimal location, size, and configuration of recharge facilities; (4) estimate the increased yield of the YDWP to meet in-basin and out-of-basin water needs.

1.2 Project management/program definition report—The purpose of preparing a Project Management/Program Definition Report would be to formulate and examine alternatives to the institutional, legal, and managerial elements of the conjunctive use program. Results from the hydrologic modeling hydrogeologic report and the alternatives formulated through that effort would be used as the basis for overall program detailed definition. A Project Management/Program Definition Report would cost about \$150,000 dollars and require 6 months to complete.

2.1 Environmental impact report/study—This task would complete the required National Environmental Policy Act/California Environmental Quality Act (NEPA/CEQA) investi-

gations and documentation. Specific permitting requirements would be addressed. This task of the project is estimated to cost \$1.3 million dollars and require 1.5 years to complete.

2.2 Preliminary design—Preliminary design drawings and specifications would be prepared during Phase 2. The preliminary design drawings would include canal plan/profile sheets; recharge basin site plans; distribution/collection piping plans; recovery wells; structures; instrumentation and control diagrams; and flood control facilities at a 10-percent level of completion. Preliminary design would also include aerial photography and mapping, geotechnical and corrosion investigations, detailed environmental surveys, and land-acquisition plot maps. Preliminary design drawings would incorporate environmental mitigation requirements identified during Task 2.1. The estimated cost of this task would be \$4 million dollars and require 24 months to complete.

2.3 Design drawings and specifications—Contract drawings and specifications would be developed from the preliminary designs. The drawings and specifications would provide all necessary detail for bidding and construction.

2.4 Construction and construction management (CM)—Construction oversight is required to enforce contract requirements and ensure a quality, functional end-product. Typical CM activities include (1) evaluating bids; (2) reviewing, approving, and testing proposed products and materials; (3) observing, photographing, and documenting all aspects of construction; (4) managing changes during construction; and (5) estimating contractor inventories, progress, and progress payments. Construction and CM activities for this facility would require 3 years to complete.

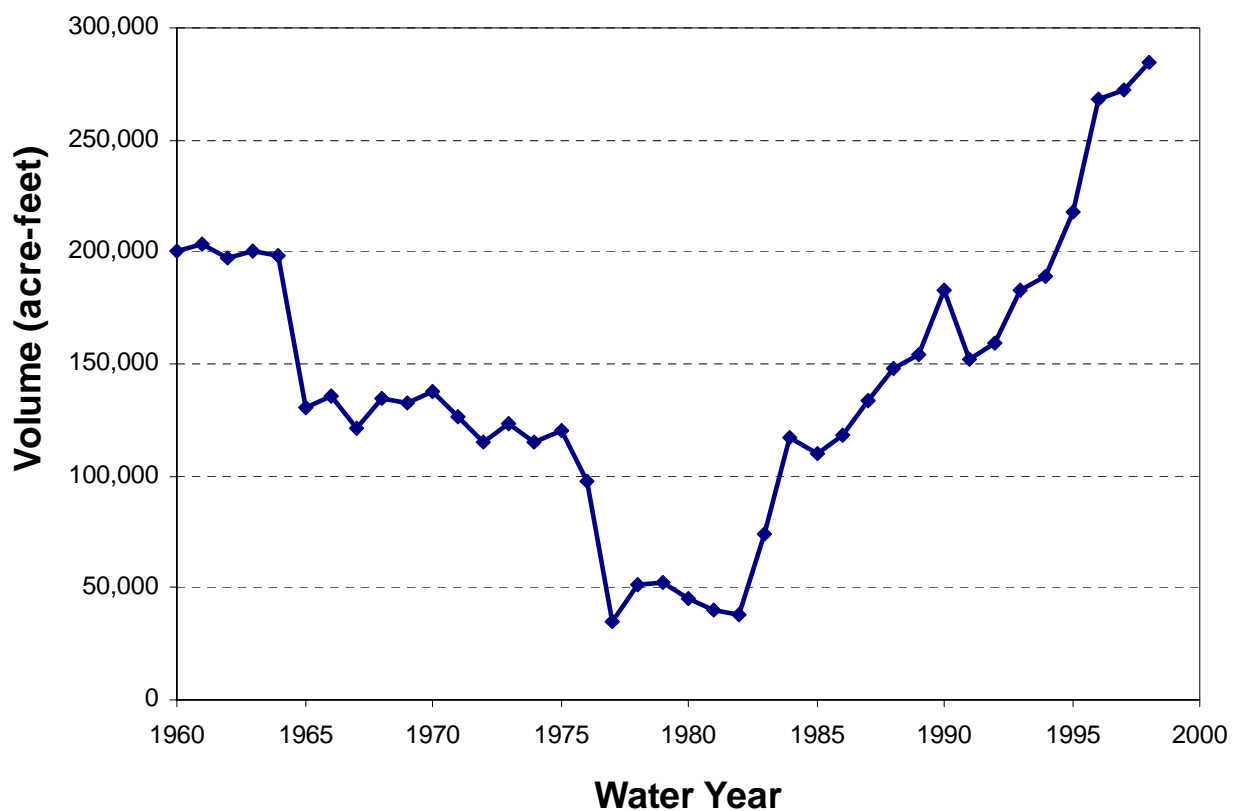


FIGURE 14A/B-1
ESTIMATED GROUNDWATER STORAGE IN THE YUBA-
SOUTH BASIN AREA FROM 1960 TO 1998 (BASED ON
200,000 ACRE-FEET OF STORAGE IN 1960)

YCWA CONJUNCTIVE USE PROGRAM
 SHORT-TERM PROJECT EVALUATIONS
 SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI

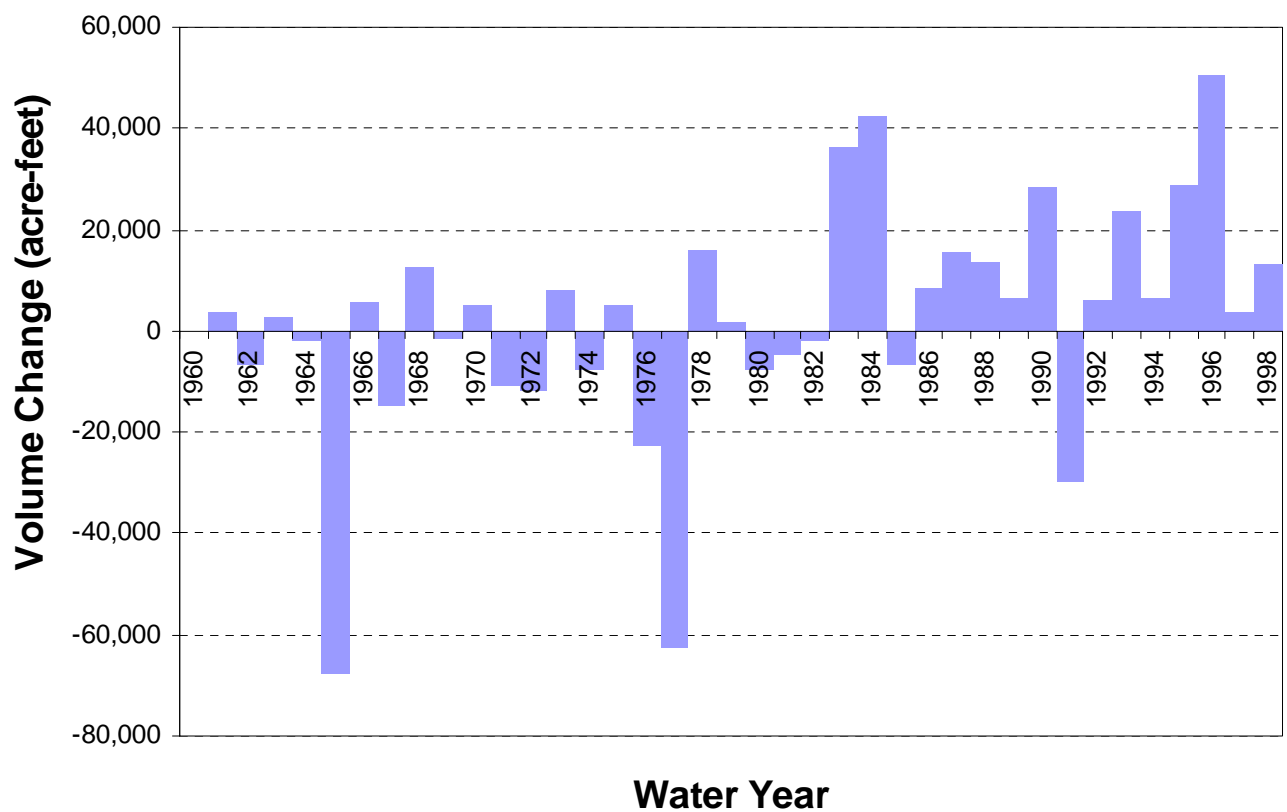


FIGURE 14A/B-2
CHANGES IN GROUNDWATER STORAGE IN THE
YUBA-SOUTH BASIN AREA FROM 1960 TO 1998
 YCWA CONJUNCTIVE USE PROGRAM
 SHORT-TERM PROJECT EVALUATIONS
 SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

**Project 14A—Draft CEQA
Environmental Checklist**

Project 14A—Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.

- | | | |
|--|---|---|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture Resources | <input type="checkbox"/> Air Quality |
| <input type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources | <input type="checkbox"/> Geology/Soils |
| <input type="checkbox"/> Hazards & Hazardous Materials | <input checked="" type="checkbox"/> Hydrology/Water Quality | <input type="checkbox"/> Land Use/Planning |
| <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise | <input type="checkbox"/> Population/Housing |
| <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation | <input type="checkbox"/> Transportation/Traffic |
| <input type="checkbox"/> Utilities/Service Systems | <input type="checkbox"/> Mandatory Findings of Significance | |

Determination:

(To be completed by the Lead Agency)

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

Printed Name

For

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|--------------------------------------|--|-------------------------------------|-------------------------------------|
| <u>I. AESTHETICS</u> —Would the project: | | | | |
| a) Have a substantial adverse effect on a scenic vista? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Short-term impacts from increased noise and dust emissions could occur as a result of construction. Mitigation measures implemented for noise and air quality would reduce any impacts to a less than significant level.</i> | | | | |
| d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>II. AGRICULTURE RESOURCES</u> —Would the project: | | | | |
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <u>III. AIR QUALITY</u> —Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Increased air emissions could result from construction of the project. Implementation of best management practices (BMPs) during construction would reduce the amount of emissions and reduce the impact to a less than significant level.</i> | | | | |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) Expose sensitive receptors to substantial pollutant concentrations? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e) Create objectionable odors affecting a substantial number of people? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|--|--------------------------------------|--|-------------------------------------|-------------------------------------|
| <u>IV. BIOLOGICAL RESOURCES</u> —Would the project: | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act, (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or, impede the use of native wildlife nursery sites? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <u>V. CULTURAL RESOURCES</u> —Would the project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>A significant impact would occur if a cultural resource were to be disturbed by activities associated with project development. In the event that an archaeological resource was discovered, appropriate measures would be undertaken to minimize any impacts.</i> | | | | |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>See response to V (a) above.</i> | | | | |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>See response to V (a) above.</i> | | | | |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>See response to V (a) above.</i> | | | | |
| <u>VI. GEOLOGY AND SOILS</u> —Would the project: | | | | |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|--|--------------------------------------|--|-------------------------------------|-------------------------------------|
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| ii) Strong seismic ground shaking? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| iii) Seismic-related ground failure, including liquefaction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| iv) Landslides? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Result in substantial soil erosion or the loss of topsoil? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| VII. HAZARDS AND HAZARDOUS MATERIALS— | | | | |
| Would the project: | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <i>Construction equipment would require the use of potentially hazardous materials. The potential for significant hazardous material spill would be unlikely because of the limited amount of such materials that would be used onsite. If a spill or release of such materials were to occur, it could potentially be significant unless BMPs were implemented.</i> | | | | |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|--------------------------------------|--|-------------------------------------|-------------------------------------|
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| VIII. HYDROLOGY AND WATER QUALITY— | | | | |
| Would the project: | | | | |
| a) Violate any water quality standards or waste discharge requirements? <i>There is a potential for an increase of erosion and sedimentation from construction activity. This would require the implementation of BMPs to reduce any impacts to waterways in and around the project area.</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). <i>There are serious concerns about the long-term draw-down of the groundwater table and land subsidence, particularly in dry years. Model development would help in determining the effects of increased groundwater pumping. The impact that groundwater withdrawal would have on existing groundwater supplies is as yet undetermined; however, it is potentially significant because of the complexity of the issue.</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| f) Otherwise substantially degrade water quality? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|--------------------------------------|--|-------------------------------------|-------------------------------------|
| i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| j) Inundation by seiche, tsunami, or mudflow? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>IX. LAND USE AND PLANNING</u> —Would the project: | | | | |
| a) Physically divide an established community? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Short-term impacts from increased noise and dust emissions could occur as a result of construction. Mitigation measures implemented for noise and air quality would reduce any impacts to a less than significant level.</i> | | | | |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <u>X. MINERAL RESOURCES</u> —Would the project: | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>XI. NOISE</u> —Would the project result in: | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Short-term noise levels are expected to increase for the duration of construction. These noise increases would be temporary, and mitigation measures would be implemented to reduce any impact to a less than significant level.</i> | | | | |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>See response to XI (a) above.</i> | | | | |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|--------------------------------------|--|-------------------------------------|-------------------------------------|
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>XII. POPULATION AND HOUSING</u> —Would the project: | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>XIII. PUBLIC SERVICES</u> —Would the project: | | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Fire protection? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Police protection? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Schools? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Parks? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Other public facilities? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <u>XIV. RECREATION</u> —Would the project: | | | | |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>XV. TRANSPORTATION/TRAFFIC</u> —Would the project: | | | | |
| a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|--|--------------------------------------|--|-------------------------------------|-------------------------------------|
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Result in inadequate emergency access? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| f) Result in inadequate parking capacity? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| XVI. UTILITIES AND SERVICE SYSTEMS— | | | | |
| Would the project: | | | | |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| XVII. MANDATORY FINDINGS OF SIGNIFICANCE | | | | |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Issues: | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|--|--------------------------------------|--|------------------------------------|--------------------------|
| c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |